MEMORANDUM FOR THE RECORD

SUBJECT : OXCART Flight Test - Outstanding
Problems Requiring Definition and Resolution

1. The purpose of this paper is to recall several known
areas of effort to be undertaken as next steps in the flight test
program following the demonstration of Mach 3.2 capability. Only
the known major areas confined to the aircraft and its propulsion
system are examined. This therefore does not include the required
confirmation and refinement of the many aircraft subsystems,
payload systems, and anti-radar systems still outstanding. Further,
it does not include those problems as yet unsurfaced during
further accelerated flight test and during prolonged periods at
high altitude and speed.

2. The several known major areas of effort to be undertaken
are as follows:

a. The present inlet configuration used on aircraft #121
to reach Mach 3.2 is experimental and requires considerable
refinement through additional flight and wind tunnel test before
a firm production configuration is established in terms of reliability
and performance.

b. The existing ejector is deficient in optimum performance
in the transonic regime during climb and requires modification
through additional flight test.

c. The existing inlet control system is set to operate
with a substantial safety margin in order not to disgorge the
shock at high speeds. This substantial safety margin penalizes
performance. Refinement through flight test is required to establish
a setting and configuration satisfactory to both reliability and
optimum performance.

d. The engine turbine temperature level and trim requirements
for optimizing performance at present are being controlled
experimentally and need refinement prior to establishing an
acceptable production configuration. Temperature level is presently
established by presetting the fuel control to an overrich schedule;
while trimming in flight by the pilot to maintain temperature is
felt to be excessive.

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e. Sustained high altitude flight at Mach 3.2 is required in order to surface those problems resulting from prolonged duration at high environmental temperatures. In addition, sustained high altitude flight at Mach 3.2 coupled with the descent must be explored in order to establish peak temperatures resulting when fuel flow, which is the heat sink for many of the aircraft and engine component systems, is retarded to establish the descent. Examination of these peak temperatures resulting from heat rejection may dictate a different pilot technique for descent or the incorporation of additional heat exchangers. This same phenomenon is applicable to an engine out condition.

f. Because of the various experimentally configured areas and the flight envelope explored to date, aircraft demonstrated performance in terms of range and altitude is obscure. Components such as the inlet, engine, and ejector all of which affect thrust-drag relationships and fuel consumption must be optimized as a matched set prior to answering this question. In this process, further refinement may be necessary in order to establish the optimum combination of transonic and cruise performance which will result in the optimum combination of range, altitude, and speed for the mission profile currently planned.

g. Refinement and confirmation of corrective actions underway is required in the areas of engine oil consumption, engine afterburner liner cracking, and an improved cockpit to engine throttle control system required to facilitate power setting during inflight refueling.

3. Because the above areas are by no means inclusive, a suppliers meeting will be scheduled soon wherein the contractors will be asked to define and discuss the next steps required in pursuance of operational readiness.

SIGNED

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Aircraft Systems Division
(Special Activities)

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